

Trees.



The Only Street of Globe-head Elms in America—Moline, Ill. (pg. 20)

14th Western Chapter, N. S. J. C. at Berkeley Calif., June, 19-21

Essential Elements In Tree Nutrition

J. F. Wischhusen

Care of Newly Set Shade Trees

Carl Fenner

May-June, 1947

The Journal of American Arboriculture

Vol. 7—No. 4

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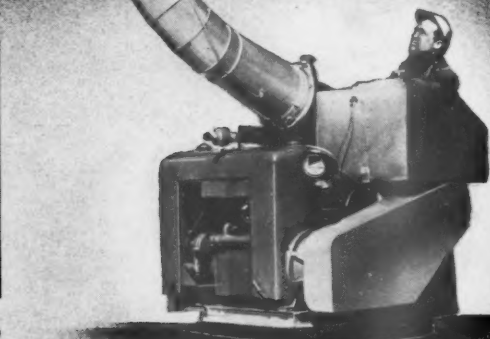
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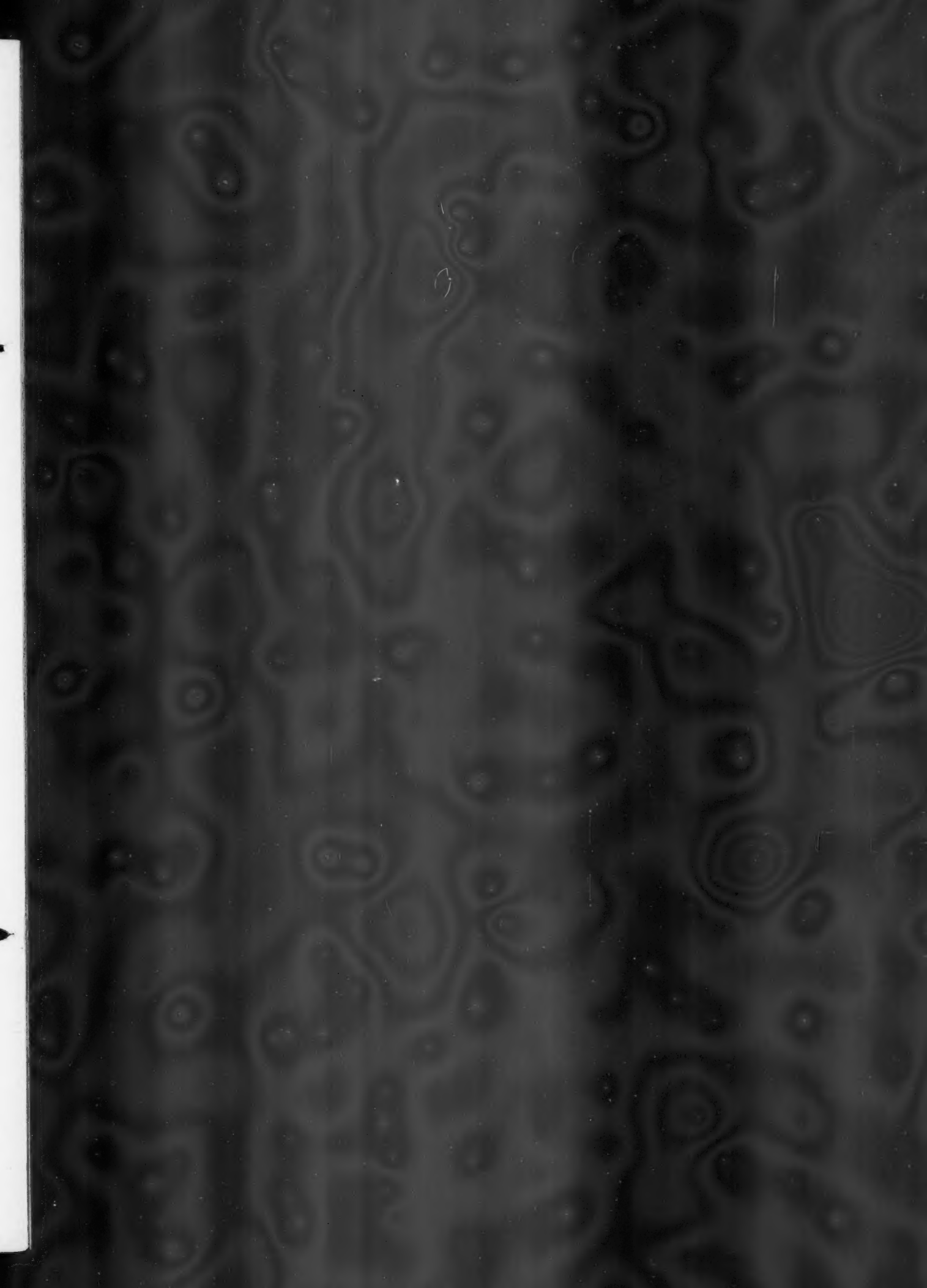
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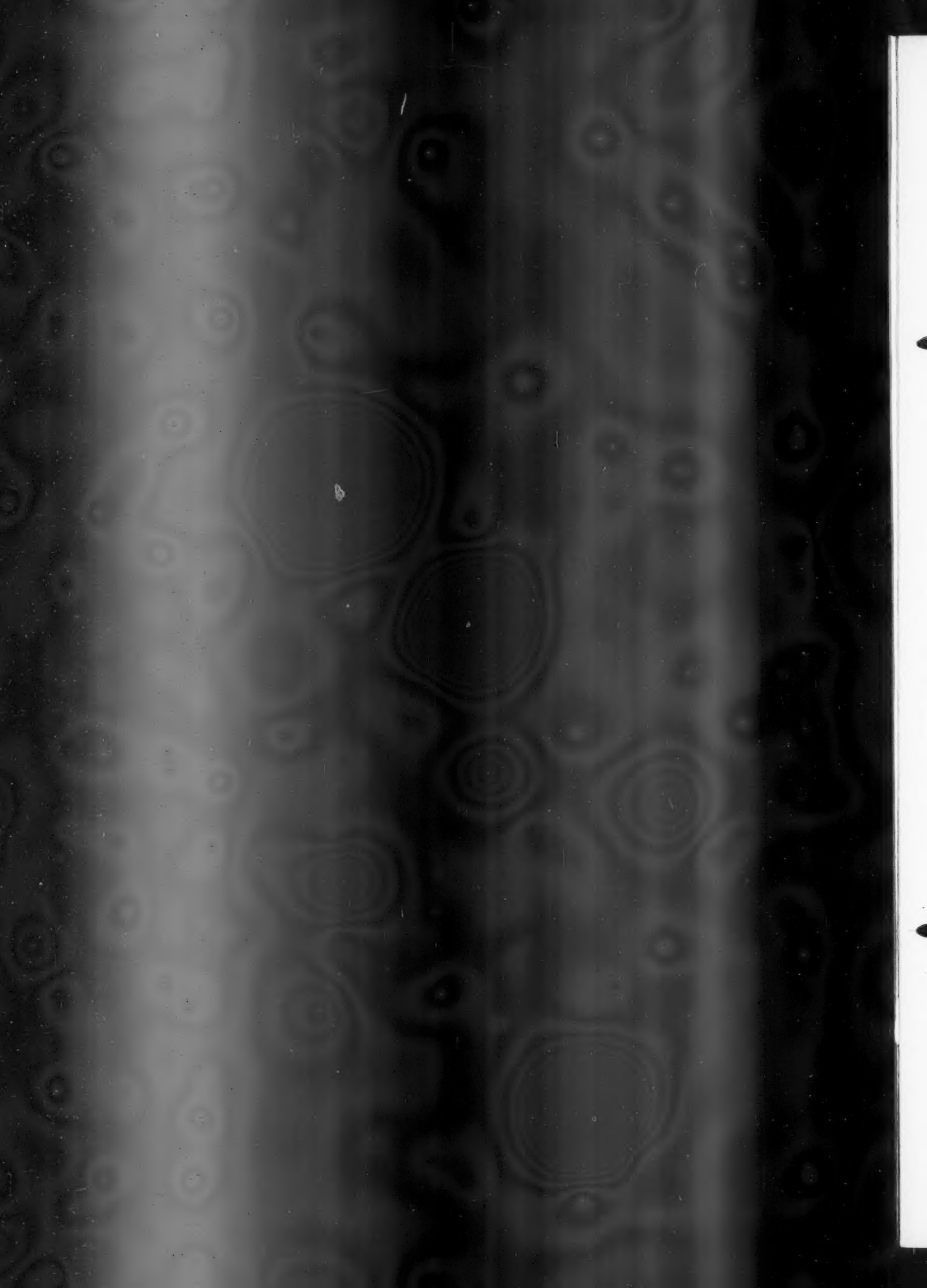


**The LAWRENCE
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Greenfield, Mass.

TREES Magazine is a bi-monthly Journal published at Cleveland, Ohio, by Edward H. Scanlon, and is devoted to the furtherance of the technical and business administration of Trees (Street and Ornamental); Parks (Municipal and National); and Forests (State, National and Private), in the U. S. Scanlon Publishing Co., P. O. Box 5607, Cleveland, Ohio. Subscription by mail \$2 per year; outside United States, \$2.50. Advertising rates upon inquiry. Unsolicited manuscripts must be accompanied by return postage.





ALONG THE WAY With . . . EDW. SCANLON

● By the way, you CALIFORNIA CHAPTER (N. S. T. C.) lads have FALLEN BEHIND in the MEMBERSHIP RACE. Ohio now stands 126 TO 109, and the CONFERENCE, AS OF MAY 13TH, has 846 MEMBERS. This is official from LOUIE (THE LIP) CHADWICK.

● Was GREATLY DISAPPOINTED to learn in a letter from LEON MILLER OF ANGOL, CHILE, that he spent SEVERAL DAYS in Cleveland LAST SUMMER, but was NOT AWARE that I had forsaken the HONEY DEW STATE FOR CLEVELAND'S SOOT, SNOW AND INIMITABLE GREENERY.

Come again, LEON.

● The FIRST COMMERCIAL ARBORIST in Ohio to have a MIST SPRAYER, as far as we know, is VERN HOUMARD OF CANTON. Vern flew east, looked at one of ED CONNELL'S LAWRENCE AERO-MIST GIZMOS, laid the LETTUCE ON THE LINE, and is now looking for SOME BUCKSHOT.

● When you COME TO CLEVELAND be sure to pay a visit to MORTGAGE MANOR—the new HOME OF TREES, its CIRCULATION MANAGERESS and ACHING EDITOR. The aching is in the back and comes from PLANTING SOME SCRUBS around the recently ACQUIRED DOMICILE. With some paint, A NEW ROOF, etc., THIS GI "BARGAIN" SHOULDN'T be too bad.

● Got a BIG THRILL the other day with the ARRIVAL FROM BELGIUM of six specimens (8'-10') of UPRIGHT LONDON PLANES. An EIGHT MONTHS SEARCH disclosed there were NONE IN CULTIVATION in the U. S. A. They are NICE TREES, were in good condition and have a NICE FASTIGIATE FORM. This tree should be a LIFE SAVER for narrow streets in SMOKY AREAS. Expect to order SEVERAL THOUSAND for fall delivery.

● For the benefit of those ATTENDING THE CONFERENCE COMMITTEE meeting at the HOTEL CLEVELAND, May 13th, the plant we ALL ADMIRE in the table piece was the GERALDTON WAX FLOWER (*Chamaelaucium ciliatum*). It comes from Australia. Bailey says it grows to TWO FEET, but in California, WHERE IT IS COMING INTO POPULARITY, it attains six feet.

● JACK KENEALY is on the ball IN ARDMORE. He has just sent us a NICE LITTLE FOLDER, for public distribution, on the CONTROL OF THE BAGWORM. It tells how to control this pest that HAS BECOME serious in SOUTHEASTERN PENNSYLVANIA in the past three years.

● DANA BOWERS is finally going to find out THAT THE U. S. REALLY EXTENDS beyond the HIGH SIERRAS OF CALIFORNIA. He has his bag (no pun) all packed to attend the NATIONAL SHADE TREE CONFERENCE in CLEVELAND COME AUGUST. The highways of CALIFORNIA should show some new twists in LANDSCAPE PLANNING as a result, or vice versa.

● At the January 29th "SILVER ANNIVERSARY" meeting of the CONNECTICUT TREE PROTECTIVE ASSOCIATION a new by-law, providing for the affiliation of COUNTY CHAPTERS of the CTPA was

set up. The first such group is now FUNCTIONING IN FAIRFIELD COUNTY, the county often referred to as "NEW YORK CITY'S BEDROOM" because of the large number of commuting residents including Clare Boothe Luce, James Melton, Libby Holman and a host of well-known personalities.

The FAIRFIELD COUNTY CHAPTER'S membership is about 50 and the recently-elected officers are President: TIM JANOSKO of Stratford; Vice-President, WILLIAM J. COTTA of Darien; Secretary, WALTON RICHDALDE of Wilton and Treasurer, ROBERT MACKEY of Stamford. Executive Committee members include M. WESLEY HALL, TOM SHAUGHNESSY and BILL KAPOUCH. Monthly meetings are held with speakers from various governmental and private research organizations. DR. ALBERT E. DIMOND of the Connecticut Agricultural Experiment Station and DR. J. C. TATE of the U. S. Rubber Company have been speakers so far.

● Candidates for that CLEVELAND BASEBALL TEAM. Deep resentment is rearing its ugly head over the intimation that the NEW ENGLAND BALL-PLAYING arborists are being passed over in the makeup of the FANCE SHIELD team. PALM STARNER of Searsdale, N. Y., who once covered the keystone sack for Penn State, BILL COTTA of Darien who played first base for the Providence team in the New England League; GEORGE CODDING of the Bartlett Company who was one of the great catchers on the Martha's Vineyard team; CARL SCHIFF, the Brooklyn Tree Warden who may yet get Durochers job; WESLEY HALL of Darien who hit for .451 in 1931—must be able and willing diamond stars from the VERY BIRTHPLACE OF BASEBALL—be over-looked to show favoritism TO MID-WESTERNERS?

● Looks like a BIG DELEGATION from California is lining up for the CLEVELAND SHADE TREE CONFERENCE (or should I have said the National). PILE IN BOYS, it will sure be GOOD TO SEE YOU.

● DR. S. F. POTTS (U. S. D. A.) the "MIST MAN" featured the May 22nd meeting of the WESTCHESTER COUNTY PROTECTIVE ASSOCIATION with an enlightening talk on MIST SPRAYING. He will lead a panel on the same subject in CLEVELAND AT THE NATIONAL SHADE TREE CONFERENCE. Other speakers at WHITE PLAINS were EDWARD W. RYNAS of the AMERICAN AGRICULTURAL CHEMICAL CO., (why don't those guys advertise in TREES?) speaking on "RESEARCH WITH FERTILIZERS" and a JOHN BEAN CO., rep speaking on "MIST DUSTING."

● The MUSE OF ROCHESTER, Jake Gerling, had a BIG WINTER with the COLORED SLIDES AND CHIN MUSIC—22 lectures—ah, those PATIENT ROCHESTERIANS.

● From way out in GREAT FALLS, MONTANA, operative Z-36 reports that TOM LEASE, ex-Park super and EXLT. COMMANDER of the Royal ROOSEVELT NAVY, has taken the BULL BY THE HORNS and has set up a nice ARBORIST AND LANDSCAPE CONCERN—Z-36 says 'all's well at the TOP OF THE ROCKIES.

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The Editors of TREES invite discussions, comments and all types of literary materials pertaining to trees and tree preservation from any person engaged either in the scientific advancement or commercial development of the field.

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● Am LOOKING FORWARD to a trip early this month to PORTSMOUTH, OHIO, on the OHIO RIVER, for the summer meeting of the OHIO PARKS ASSOCIATION; how about it boss?—INCIDENTALLY, if every city had a DIRECTOR OF PARKS AND PUBLIC PROPERTIES like ART MUNSON there would be a lot LESS HEADACHES for city arborists. Of course, THERE'S A GOOD REASON for his love of trees, he's a LANDSCAPE ARCHITECT (A. S. L. A.); and there is no more of that misnomer, CITY FORESTER, in Cleveland—the boss just made me COMMISSIONER OF SHADE TREES.

● An OUT-OF-THE-COUNTRY subscriber has been heard from—RAMON DURAN MUCIENTES of RIO de JANEIRO sent a lovely colored pic of the YELLOW FLOWERING BRASILIAN "IPE" with the query, (in reference to my squib, LAST ISSUE, on the BEAUTY OF THE CREPE MYRTLE) "do you think that tree as beautiful as the Ipe." All I can say is that if it's HALF AS BEAUTIFUL as the picture I'VE GOT TO SEE IT.

● We hope the TREES ON THE COVER will one day be DUPLICATED on the STREETS OF CLEVELAND. This spring two of my boys, JOHNNY WOJS and CHET LAPINSKI, did a nice job of TOP WORKING 800 ENGLISH ELMS to Globes, and while they were at it, grafted 350 GOLDEN UPRIGHTS. This Golden Elm (*ULMUS CARPINIFOLIA*, V.A.R. WREDEI) is a handsome tree and SHOULD BE MORE WIDELY USED.



May-June, 1947

Journal of the National Arborist Association

Vol. 7—No. 4

EDWARD H. SCANLON, Editor

Box 5607, Cleveland, Ohio

“No place is complete without trees. A home without trees is charmless; a road without trees is shadeless; a park without trees is purposeless; a country without trees is hopeless”

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Out on a Limb

AN ARBORICULTURAL BOOK SERIES?

What this country needs more than a good five cent cigar, or to be in tune with the times, a good “twofer” a quarter, and in particular all of the professions working with and using trees, is a good manual of the ornamental trees in America.

At present there is none. Those we have are incomplete. Practically all of the publications are a reprint of one another. They stress the natives, and then only the more common ones, and those used in connection with forestry. The cultural requirements of ornamentals, and their care, are diametrically opposed to the requirements of forest trees. Then, too, when one searches for data on promising exotics he is doomed to failure for it does not exist. This seems like a golden opportunity for arboriculture to launch the first of a series of manuals similar to the American Forestry Series published by McGraw-Hill Publishing Co.

The series has a potential of at least six volumes that come to mind at this time, more would probably result. These might be titled as follows: Manual of the Ornamental Trees of America, 2. Textbook of Arboriculture, 3. Manual of Street Trees, 4. Shade Tree Pathology, 5. Shade Tree Entomology, 6. Shade Tree Law.

Such a series should have a good effect toward convincing some people that there is more to arboriculture than mere

“tree surgery.” TREES would like to put in motion a program whereby a beginning could be made toward the realization of such a series and would with reasonable support from the field undertake to launch such a project. Comments would be welcome.

NATIONAL ARBOR DAY

It was unfortunate that this past winter we were unable to take any action toward furthering the establishment of a national Arbor Day.

Last year seventeen states observed the *last Friday in April* as Arbor Day which was perhaps the most uniform widespread observance in the history of this notable day.

There are many advantages to a certain set date, one of which is, that with the possibility of a different date each year school teachers are kept waiting until the last minute before they learn the date. With a set date literature could be printed and plans made well in advance. The argument has been advanced in opposition to the set date that it is impossible to have a single date of observance for the entire country. With this we must disagree one hundred per cent, unalterably. In the first place the date is usually picked by the Governor about three or four months ahead, and anyone who can prognosticate this weather that far in advance has no business wasting such talent being governor. It would seem that a

uniform date would hit a favorable day more often than it would fail.

For next year we shall start early and set up committees in key states to obtain a change in statute, or to establish by statute, such as that effected last year in Massachusetts by Malcolm McKenzie, Ed Higgins and others. Massachusetts was the first state to legalize National Arbor Day, so, in two years when the state legislatures again convene we must be ready on opening day to have bills presented in at least twenty states.

OHIO TREE PRESERVATION BILL

There has long existed a need for regulation of professional shade tree preservation practices. Numerous cases of malpractice, such as spraying with water instead of recognized insecticides and fungicides at recommended rates, butchery in shade tree pruning, fertilizing with non-essential materials and the classic cure-all treatment with some secretive substance which will allegedly rid trees of all insects and diseases including, for example, such epidemic diseases as phloem necrosis of elms for which there is really no known prevention or cure, occur annually. A tree preservation bill, House Bill No. 276, now being considered by the Ohio legislature is designed to put an end to such evils.

At least seven states now have similar laws and have found them highly beneficial. Shysters and unqualified operators, among others, will oppose this bill. Such legislation will not curtail the operation of competent operators. It will raise the level of the profession of Arboriculture in Ohio.

This bill provides for the examination of persons engaged

in the improvement, protection and preservation of shade and ornamental trees in incorporated cities and towns. Persons wishing to engage in any tree preservation practice such as pruning, fertilizing, spraying for insect and disease control will be obliged to first obtain a license from the Director of Agriculture. Licenses will be granted to qualified persons, following an examination prepared by an examining board of qualified examiners. Applicants shall pay an examination fee of ten dollars and a fee of ten dollars each for each license or yearly renewal granted. Funds thus collected and only such funds, will be expended to defray the cost of enforcement of the act.

The Director of Agriculture will be empowered to specify and enforce such rules and regulations as are necessary to carry out the provisions of the bill. Each operator contracting for arboricultural services in the state shall be required to assume responsibility for the way in which his tree work is executed. He must personally supervise his tree contracts or assign a licensed representative to the job. Adequate fines are specified for violations of the law.

There is nothing in the bill to hinder anyone from doing tree work on his own place or having a regularly employed gardener do such work, without securing a license. Nurserymen may practice tree care incidental to the fulfillment of their tree planting contracts without securing such a license.

Anyone who has a genuine interest in the aesthetic or intrinsic value of shade or ornamental trees in his own community should contact immediately his State Representative and Senator, in person or by letter, and urge passage of House Bill No. 276.

"All That Glistens Is Not Gold"

For some strange reason the true depth of the scientific requirements of the field of arboriculture seem to have completely eluded some people in other fields of horticultural and agricultural endeavor. Recently there appeared in the *Journal of Forestry* an article titled "American Forestry Schools Must Come Out Swinging," written by George Vitas, a consulting forester of Houston, Texas.

Mr. Vitas, in discussing how American forestry schools should open up avenues of employment for their super saturated enrollment, suggests, among a host of other non-forestry occupations, that the young forester by reason of his excellent background should go into "tree surgery," as he puts it.

The following is Mr. Vitas' paragraph on "tree surgery" and an answer by Charles F. Irish, president of the National Shade Tree Conference:

Tree surgery.—The public insists on picturing the forester in a tree surgeon's garb. All right, let's satisfy the public. The principles of tree surgery can be taught to a forester in a short time. With his fine background in botany, dendrology, soils, etc., it's only a matter of showing him how. Acquaint him with the tools of a tree surgeon; give him a few demonstrations of how to prune, trim, scrape, fill, brace, and feed trees. Show him how to combat insects and diseases and let him do it. On the streets of any town he will find plenty of material to work with. Foresters, sufficiently interested in this field could follow it up in more detail on their own. Many tree surgeons of comparatively limited schooling are making an excellent living out of this easily acquired art. The forester can, too.

May 6, 1947.

Mr. Henry Clepper, Executive Secretary,
Journal of Forestry,
Washington 6, D. C.

Dear Mr. Clepper:

Thank you for the copy of your letter of April 18th to Mr. Carlisle Davidson, The Real Estate Board of New York, Inc. On behalf of the commercial arborists I wish to express their appreciation that you do recognize Arboriculture as a professional field separate and apart from forestry. I feel that the qualified arborist has neglected to tell or show the rest of the world what is necessary to really make an individual competent to practice arboriculture.

When the *Journal of Forestry* publishes as it does on page 166,

Vol. 45, No. 3, a paragraph entitled "*Tree Surgery*" which gives the reader an untrue picture of arboriculture as practiced in the United States by many individuals and corporations, I think it is high time that the arborists exert themselves to stop professional foresters from further misrepresentation.

I commend Mr. Geo. Vitas the author of the article "American Forestry Schools Must Come Out Swinging" of which the paragraph *Tree Surgery* is a part and for his concern for future students now in forestry schools. I rebuke him when he writes:

"Tree Surgeons of comparatively limited schooling are making an excellent living out of this easily acquired art. The forester can, too."

Such a statement should never have been written by one having Mr. Vitas' "fine background in botany, dendrology, soils, etc." and having been written never should have been published in the *Society of American Foresters'* official organ because it is most misleading and unfair to tell students of forestry that their basic courses have fitted them to come out swinging as an arborist or that it is just "a matter of showing him how." In just which schools of Forestry would Mr. Vitas have this future arborist shown and how and who would do the showing. Would it not be a case of the blind leading the blind for the majority of forest schools to attempt such instruction unless they added to their present faculties. Mr. Vitas is quite correct in that many men of limited schooling are making an excellent living in not as he terms it tree surgery but in arboriculture. This does not justify the *Society of American Foresters'* to encourage the entrance of other unqualified men into the field nor does it disprove the fact that a great fund of information is necessary before an individual is properly equipped to perform the various operations in the arboricultural field.

We do need men in the field of arboriculture but let them be men properly informed. My guess is that the forests are full of foresters who have no degree in forestry but have become efficient foresters in spite of this deficiency, well a lot of us arborists may well be in the same situation. In the past, we could take certain courses at various colleges but nowhere could we take a course specifically designed to fit one for the field of arboriculture. Yes, I know some schools had courses for City Foresters but from my experience with their graduates I insist these men were unable to show an employer of arboricultural help that they were fully fitted to perform all phases of our work upon graduation.

It is high time the forest student as well apparently as the majority of graduate foresters become correctly informed what the

(Continued on page 12)

Essential Elements In Tree Nutrition

By J. F. WISCHHUSEN

Manganese Research & Development Foundation, Cleveland, Ohio

Mankind has harbored an age-old grudge against insects and fungi, so that under the heading of crop protection from these pests there has developed a large insecticide and fungicide industry.

Relatively little attention has been paid to the effects of a nutritional character that can be obtained from simultaneous applications of essential elements. Insects will probably always constitute a problem of destruction, either of them or by them. But fungi, bacteria, viruses, can be made to combat, control and balance each other, depending on the conditions under which their propagation is either facilitated or inhibited.

There is evidence that so-called essential nutrients, also variously referred to as "minor," "trace," "rare," or "micro" elements play a direct as well as an indirect role of considerable importance in this matter, and that trees can be fertilized, sprayed, injected or treated with them in other ways to insure their growth, health, crop bearing ability, longevity, disease, frost and drought resistance. There still exists a paucity of scientific explanations on these subjects, but there is already a good deal of scattered information, which it is my purpose to draw to your attention. People do not care about scientific facts if they can obtain results without them, and then scientific concepts too may undergo changes. The manner in which trees obtain their nutrients from soil, air and water, however, will forever remain unchanged, whether we understand it or not, and it behooves every grower to observe effects from causes, and to reflect upon them, and report his observations to his association for the benefit of all.

Physical Soil Characteristics

That the primary requisites for tree growing are the physical characteristics of all soils favorable for that purpose requires no discussion. The successful nut tree planting starts with the soil, whether it be on the scale of an orchard, grove, or just a few trees around the farm or garden.

The better soils for general crop production are on limestone, basalt, dolomite, dolerite, diorite and gabbro formations (1), whereas sandstones, aplites, granites, pierre shale, cretaceous rocks and volcanic formations weather

Paper presented before the Northern Nut Growers Association Convention, September 3-5, 1946, Wooster, Ohio.

into inferior soils. Gneiss can be sometimes good, sometimes unfavorable, for building of fertile soil.

It is well to bear in mind that geology and botany are our two fundamental sciences of industry, and that all our other sciences are in reality departments of these. Chemistry can be either a branch of botany if it deals with organic chemistry, or else a branch of geology, if it deals with inorganic chemistry, and it would appear that the modern scientific grower of nut trees or any other crops is wittingly or unwittingly concerned with both. Biology and zoology both are branches of botany.

The Essential Elements

In the past, economics have governed any crop production, whether of trees, grains, fruits or vegetables; not nutrition and health. The future in all likelihood will demand improved crops from the standpoint of nutritional purposes as foods. It is gradually being realized that the production of better crops can be brought about by greater application of essential nutrients to soils or as nutritional sprays direct to trees, and that such practices also reflect true economics. The same principle should govern wood production.

According to our today's knowledge, there are at least *nineteen elements invariably essential to life* (2), viz:

Primary: Hydrogen, carbon, nitrogen, oxygen, phosphorus.

Secondary: Calcium, magnesium, sodium, potassium, iron, sulphur, chlorine.

Micro: Manganese, copper, boron, silicon, aluminum, fluorine, iodine.

Then there are another eighteen elements at least *variably necessary to life*, viz.

1. Variable Secondary Elements: Zinc, titanium, vanadium and bromine.

2. Variable Micro-Elements: Lithium, rubidium, caesium, silver, beryllium, strontium, cadmium, germanium, tin, lead, arsenic, chromium, cobalt and nickel.

Elements in Soils Essential for Plant Growth

It is furthermore safe to state at the present time that fertile soils should contain at least the following twenty elements:

Nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, hydrogen, carbon, oxygen, iron, sodium, chlorine, aluminum, silicon, manganese, copper, zinc, boron, iodine, fluorine.

Until quite recently many scientists believed that only the first ten elements were necessary for growth and maturing of crops; that only the first three should be considered as fertilizer ingredients,

and that the others were supplied by soil, air and water, or were present as natural fillers in manures and fertilizer raw materials.

The modern agronomist, however, takes all these twenty essential elements into consideration, and many so-called "complete" fertilizers contain at least sixteen to eighteen, if not all of the elements mentioned above. Cobalt, essential to animal nutrition, can also most economically be supplied through the soil, even though crops grow without it.

As long as we have sufficient experimental research data that at least nineteen elements are *invariably essential to all life*, it stands to reason that they at least must also be present in one way or another for the normal, or better the optimum growth of nut trees, and a crop of more nutritious nuts. Therefore, every time one of them is considered, all the others must also be borne in mind. It will neither prove difficult nor costly to experiment with them. It is a matter of finding the proper balance of everything essential for optimum nut tree growing.

Indeed, to ascertain the true balance of all elements that are invariably essential to life, and their relationship to the elements which are variably essential, would quite naturally appear to constitute the quintessence of research still to be performed. We cannot control such essential factors as climate, weather, sunshine, but man can control the supply and adjustment of nutrients to trees, and it rests entirely with him to do so.

There is one advantage a nut crop has over some other crops; it does not have to be harvested before fully mature. Nut crops obtain the benefit from elements that may be slowly assimilated during the season.

The following experimental and historical evidence and opinions have come to my attention, and I record them for what interest they may have. Past experience is often discarded as too old, but many a time an experimenter was ahead of his time, and his work remained unrecognized, so that now some old references can be revived and presented as novelties. What the past ignored may indeed be due to the ignorance of those who did the ignoring.

1.—The Chestnut Blight

The chestnut blight, for instance, of a generation ago, may be re-examined in the light of the proceedings before a chestnut blight conference, held at Harrisburg, Pa., February 20-21, 1912. A chestnut extract manufacturer, a Mr. W. M. Benson (3), stated at the time

that in his experience the best extracts were made from trees high in lime. "A blighted tree," he stated, "is simply a tree in the process of starving to death for lack of lime." Maps showed that the blight was worst where there was least lime, and at that the chestnut trees died in Tennessee, where soils are high in lime. Analysis showed that chestnuts contained 40 per cent lime, an unheard of amount. That this high test may reflect a faulty condition is pointed out later.

All I can add to this is that there is an English Walnut Tree, Alpine variety, on the farm of Mr. Deknatel, on Route 202, Chalfont, Pennsylvania, which is remarkable for its virility and crops of large nuts. This tree grows in a place protected by house and barn near a well, in limestone soil. It resisted the severe winters of 1935 and 1936, when many other English Walnuts in the vicinity died. My opinion is that any tree in that location would be an outstanding tree; and vice versa, had that particular tree been planted in another location, it would have done no better than any trees there located. Nuts from that tree might well be tested and compared with nuts from other trees.

2—The Banana Blight

The banana blight in Central America threatened for a while to be as destructive as the chestnut blight in this country. It was due admittedly to an attack by soil fungi, but no fungicide to foliage or to the soil served its purpose. However, the proper restoration of bacterial life in soils to keep the soil fungi in check proved effective. This was a matter not of the presence or absence of any one inorganic nutrient, but of restoring to soils the balance of fertility, an abundance of organic matter as food for bacteria. Dr. George D. Scarseth, West Lafayette, Indiana (4), is one of those largely responsible for correcting this epidemic. His experience may prove useful to nut growers, so that they may not live in constant fear of another blight epidemic as the one that exterminated our chestnuts only a generation ago.

3—Tree Nutrition, Microbial

From England comes interesting information about "Tree Nutrition" (5). Evidence shows that the healthy growth of trees such as pines and spruces is intimately bound up with an association between their roots and fungi present in woodland soil. Poverty in mineral nutrients is no longer regarded as a necessarily critical factor in the failure of growth of trees of this kind, since the associated fungi have at their disposal sources of supply inaccessible to the roots of higher plants.

Experiments carried out during the past ten years at Wareham in England

fully confirm the opinion expressed long ago by Professor Elias Melin, Upsala, Sweden, that the growth of trees and other plants on poor soils of the raw humus type is greatly influenced by the root-fungus association. By fostering the appropriate combination it has been possible to carry out successful afforestation of heathland so poor that ordinary cultural methods prove inadequate for the least exacting tree species. Satisfying the mineral requirements of the trees by direct application of fertilizers is not in itself sufficient treatment to ensure continued healthy growth; biological factors also play an essential role in promoting soil fertility. The experiments have shown that failure of the trees to establish a satisfactory biological equilibrium with the necessary fungi is due in this case, not to the absence of these fungi in the soil, but to their inactivation by toxic products of biological origin. The factors inhibiting the activity of the fungi can be removed by the application of comparatively small amounts of organic composts which produce dramatic and lasting effects on the growth of roots and shoots.

The special composts used are prepared from organic materials such as straw, hop waste and sawdust. The mechanism by which they stimulate growth is still obscure. All of them contain small amounts of directly available plant foods such as phosphates and potash, but careful investigation both in laboratory pot cultures and in the field, has shown that these can account for only a relatively temporary effect on growth. It is suggested that the composts act mainly by modifying the course of humus decomposition, thus bringing about drastic changes in the biological activities of the organic substrate of the soil.

This demonstration of the profound influences of biological factors on the nutrition of trees challenges the attention of foresters and has important practical applications. By making use of suitable composts, it will be possible to carry out the successful afforestation of land formerly regarded as wholly unproductive.

For further information see "Problems of Tree Nutrition" (5).

From the two foregoing examples it is seen that in the case of banana blight fungi had to be suppressed by bacteriae, but that for pine trees on poor English soils fungi had to be activated for proper tree nutrition.

4—Inorganic Tree Nutrients

Other information also from England concerns the use of so-called "minerals" which I prefer to call "essential inorganic nutrients," and name by the element or the compound in which the element is contained. "Minerals,"

strictly speaking, refers to compounds formed by nature as rocks, ores, brines, salt deposits, etc.

Professor Wallace, Director of Britain's Long Ashton Research Station (6), has laid the foundation for diagnosing mineral deficiencies by leaf symptoms. These are reliable indicators of what nutrients to furnish plants when they are distinct and easily recognized. But for subacute deficiencies, plant analysis and injections are resorted to. Injections of manganese sulphate as pellets into holes drilled in trunks of cherry trees caused orchards that had been barren, to bear heavy crops a few months later.

Manganese, boron, zinc, copper, iron, magnesium also lend themselves quite readily for applications as nutritional sprays, when applied as suitable compounds such as the sulphates. Both spray applications and tree injections have great diagnostic values, because a response to them, if needed, is relatively quick. When trees are deficient their foliage will show marked improvement from a spray application within a few days, so that a test can be made on a few trees before an entire orchard is treated. Trunk injections should of course be made during the dormant season for results to show the following summer.

5—Nutritional Sprays

Florida and California lead in the application of nutritional sprays on citrus and other fruit (7). Vegetables, too, respond remarkably thereto (8). I see no reason why nut trees likewise should not benefit from them, especially when other spray materials are used. Copper sulphate, zinc sulphate, manganese sulphate, magnesium sulphate, iron sulphate, cobalt sulphate and borax are all compatible with each other and with most other spray materials. Combination sprays seem to perform better, anyway, than single sprays, and the only objection would seem to be that some element is applied that is not deficient. It can be taken for granted, however, that nothing is wasted, even though the benefits may be invisible. Soils benefit in the long run from sprays. One element, even though not noticeably needed, may make another available or it may antidote toxicity of some element present to excess. Indirect results in all likelihood are always obtained.

In Florida, recommendations for spray applications to citrus are made annually (9). They can be obtained from the Florida Citrus Commission, Lakeland, Florida. A typical formulae is as follows:

3—5 lbs. zinc sulphate
3—5 lbs. manganese sulphate

2—5 lbs. copper sul-

(Continued on page 18)

The Care of Newly Set Trees

BY CARL FENNER,
Asst. City Forester,
Lansing, Mich.

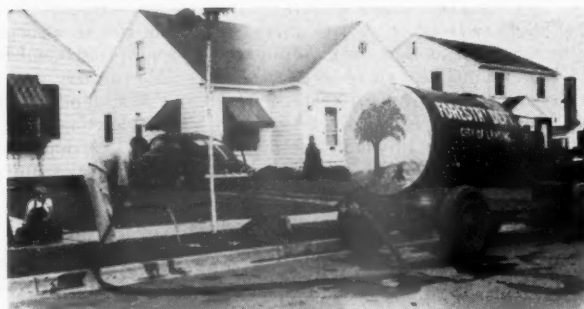
A tree worth planting is worth caring for. All street shade trees planted by our municipal shade tree department are given help in becoming established in their new locations. In our neck of the woods newly set trees need, principally, water, cultivation and protection from the flat headed apple tree borer larva. These needs are supplied during the first three growing seasons after planting—if the condition of the tree requires it.

Immediately after the spring planting season in April, begins the job (to prevent borer egg laying) of wrapping trees set out during the spring and previous fall planting seasons, and the re-wrapping of a few trees of 1945 plantings that had lost their paper coats. Occasionally a low vigor tree is severely pruned back and given a shot of inorganic nitrogen food. Dead trees are removed, and removal noted on address list, same to be replaced during the next planting season.

Water is supplied, Photo 1, from trailer (home-made) mounted water tank. Last year the complete route was

The home-made but very effective water tank in use by the Lansing, Michigan, Shade Tree Department.

Photo Courtesy
the Author



covered by the one-man ("what-a-man" Gerald Evans, World War II Vet.) crew three times between May 1 and October 1.

As will be noted in the Photo 1, a trench, shovel depth and width is dug, leaving a strong 12-inch "collar" intact at the base of trunk. The trench is nearly filled with about 14 gallons of water. Soil is replaced when most of the water has soaked into root area, and the surface left in loose mulch condition.

Interested property owners along the way are advised to supplement city watering twice a month by surface watering, followed by cultivation when top soil becomes mellow. Not many

folks act on the advice.

Any tree which, during its second year after planting, appears to be thrifty and in A-one health is cut off the list after receiving a good bye kiss of 2 to 4 pounds of a balanced tree food.

Costs of the care program in 1946 were as follows:

Labor (.90 to \$1.00 per hr.)	\$ 859.46
Truck use and depreciation charge	421.00
Trailer tank depreciation charge	60.00
Fertilizer	16.00
Wrapping paper and twine	92.00
	<hr/>
	\$1,448.46

Chronology of a Frost Crack

BY F. S. JOHNSON
Cornell University, Ithaca, N. Y.

Last spring one of the most interesting trees on the Cornell Campus was cut down to make way for a new building. The unusual feature of this tree, an English oak (*Quercus robur*), which has attracted the attention of students and faculty members for many years is the presence of two frost cracks on the trunk with such a thick callus development around them that the shape of the trunk was completely distorted. Picture of this tree has appeared in many texts and publications on tree pathology such as, Dr. W. H. Rankin's "Manual of Tree Diseases," Felt and Rankin's "Insects and Diseases of Ornamental Trees and Shrubs" and an article on frost cracks in Tree Talk by G. M. Codding, to mention a few.

When the tree was cut down a section of the trunk cut through the lower crack was obtained for photographing and study. The trunk was sound, showing little evidence of decay, making observation of the annual growth possible. It was found that the tree was sixty-six years old and that it had first cracked during the winter of 1892-93,



Cross-section of the English Oak described by the Author in the text. The frost crack described runs from the heart to the lower right hand corner of the picture.

Photo Courtesy
the Author

when it was thirteen years old, after an unusually vigorous growth year.

The crack opened more or less regularly every winter for the next thirty years, opening the last time during the winter of 1921-22. Because of the callus growth produced around the crack each year, the trunk eventually assumed a completely distorted shape, with a radius of only $8\frac{3}{4}$ inches on the unaf-

ected side compared with $15\frac{1}{2}$ -inch radius measured through the crack.

There was no apparent correlation found between the winter temperatures from available records and the failure of the crack to reopen after 1922. The only climatological data available for this period were monthly high and low temperatures. However a definite correlation between the failure of the crack

(Continued on page 16)

OUR PUBLIC RELATIONS

Most large manufacturers and service trade organizations have public relations departments. The purpose of these departments is to develop and maintain a good impression of the company and its products or services in the mind of the public. This is important. When a company has the confidence and respect of the public, it finds ready sales for its products or services.

Does the arborist have public relations? He most certainly does and, whether they be good, bad, or indifferent, always will have them. Not only individual arborists, but the shade tree industry as a whole has public relations and, to a large extent, the public's opinion of the industry is determined by its impression of individual arborists.

In a community where one or more arborists operate, have good public relations, and give honest service, the profession is well thought of. These arborists know many of their clients personally and keep in contact with them the year around. They make themselves and their company a part of the community and enter into civic affairs. Some of them find time to belong to a service club. They help support a church and attend at least once in a while, not for business reasons, but because they believe the work of the church is good and worth supporting. These arborists are members of the Chamber of Commerce and the local Better Business Bureau.

The equipment of the arborists we are talking about is in good working order, clean, painted, and displays the company name in a dignified and attractive manner. The workmen on the job are courteous, quiet, neat, and industrious. The foreman is intelligent and able to explain why the job is done in a certain way if the client asks.

Such arborists do not charge exorbitant prices but they do charge a price that enables them to do good work, pay their help a fair wage, and to realize a legitimate profit. They keep an adequate set of books, know their costs and do not cut prices to take a job away from a competitor. They hold their clients and obtain new ones on the service they render and not by running down their competitors. These arborists make few promises but carry out to the letter the commitments they do make. They carry insurance to protect both themselves and their clients. Untrue and misleading statements are not found in their advertising. They belong to their local and national organizations and make an honest effort to keep informed so that they can furnish the best possible service.

Did someone say—"Hell! There ain't no such arborists." Maybe not,

NAA NEWS



By PAUL E. TILFORD, *Secretary*

Box 426, Wooster, Ohio



Paul E. Tilford, *Secretary* (left) and Ross Farrens, *President of the National Arborist Association*, take in a big tree on the *Secretary's recent trip through the "sticks."*

but there are plenty of large, medium and small operators giving good service, conducting their business in an ethical manner, and who have the respect of the public. They are the backbone of the industry. But, unfortunately, there also are many whose public relations are nothing to be proud of and they lower the public's confidence in the profession. In many communities an arborist or shade tree expert is considered a "gyp" until he proves himself otherwise. That attitude on the part of the public has developed as a protection against the unscrupulous so-called tree expert or arborist.

Why am I saying all this anyway? Simply because the arborist's profession does not stand as high in the public's esteem as I think it should. It can be elevated only as the individuals or companies in this work improve their public relations. Think it over. If your public relations are not what they should be, you will benefit yourself, your company, and the whole industry by im-

proving them. We never can reach perfection, but if we try we can do better.

What are we—Arborists, Tree Surgeons, or Tree Experts?

In checking through the membership of the National Shade Tree Conference, one finds that the ratio of the number of times that the words arborist, tree surgeon, and tree expert appear in company names is about 1:2:6. Many companies use the term "tree service" in their names. Most all of the companies listed endeavor to give a complete tree care service regardless of whether the name indicates they are arborists, tree surgeons, or tree experts. Are these terms synonymous and should they be used interchangeably?

The word "arborist" has a very definite meaning. An arborist is "A person skilled in the manner of tree cultivation," "A specialist in the field of tree culture," "One whose life work is devoted to the upkeep and assistance, exposition and preservation of trees." These definitions were given in the winning essay, submitted by C. George Pazdrey, in the contest among college students on the subject—"Arborist—Origin and Meaning of the Word," sponsored by the National Arborist Association last year. Arborist and Arboriculture are good words with definite meanings, broad enough to cover the field of tree care. Unfortunately they are words not too familiar to all of the general public. We should strive to educate the public in the meaning and use of these words.

The term "Shade Tree Expert" or "Tree Expert" has come to mean much the same as the word "Arborist." It signifies a person who is proficient or expert in the care of trees. It is less dignified than Arborist but in some sections of the country it is a more familiar term to the public.

"Tree Surgery" and "Tree Surgeon" are terms found in every good dictionary. They have a definite meaning. Tree surgery is "the operative treatment of diseases of trees, especially for decay" and a tree surgeon is one who practices tree surgery. (Webster's Collegiate Dictionary). Cavity work, the removal of diseased parts, and possibly pruning or trimming are correctly speaking, tree surgery, but certainly transplanting, spraying, fertilizing, and many other phases of tree care are not. Tree surgery is only a very small part of arboriculture as it is now practiced by the arborist or tree expert.

It is somewhat misleading for companies offering a complete line of tree service to designate themselves as tree surgeons. However, this may not be important. Such companies through

(Continued on page 22)

The Arborists Clinic

Iron Cross Explained

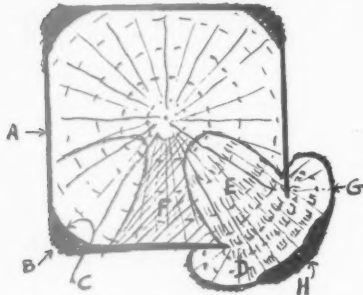


Diagram Courtesy Arthur B. Williams

A—Squared surface; B—Bark remaining; C—Live cambium layer; D—New growth; E—Living wood; F—Dead wood; G—New bark; H—Old bark (Same as B).

The cut above may serve to make clear what happened in the case of the odd-looking tree section shown in the last issue of TREES. The tree trunk had been squared when the tree was 7 or 8 years old, and left as a standing live tree. The bark remaining on the corners then proceeded to grow over the squared surfaces.

QUESTION: In TREES Magazine of January-February, 1941, R. R. Fenska, in his article "The Shade Tree Expert Reflects" made reference to a forestry school which has a four-year course preparing graduates for the work of the arborist. The name of the school was not mentioned, and I would sincerely appreciate this information.

Inasmuch as the registrar of my present school of forestry will not give me the name of the college in question, I hope you will be able to help me.

Forestry Student.

ANSWER: Write to the following: Prof. Karl Dressel, Forestry Dept., Michigan State College, East Lansing, Mich.

Prof. Robert B. Miller, Michigan College of Mining & Technology, Houghton, Mich.

Prof. Theo. Mathieu, Forestry Dept.,

OPEN FORUM

QUESTION: There have been countless pages of discussion concerning the fertilizing of shade trees, but to the best of our knowledge it usually refers to established trees.

How about fertilizing at time of planting? There are probably as many opinions as there are experts, but we should like to read some of them anyway.

Over a period of many years in the nursery and landscape business we have used different methods of feeding trees when they are planted. Of course, it depends somewhat upon the kind of tree, existing soil conditions, and other factors, but in general here are some of the materials we have used:

- 1—Humus alone and humus mixed with topsoil.
- 2—Well-rotted stable manure (cow and/or horse) mixed with topsoil.
- 3—Dried cow manure (Driconure, Bovung, etc., mixed with peat moss and topsoil.
- 4—Agrico for Lawns, Trees and Shrubs (6-10-4) mixed with peat moss and topsoil.

Frankly, we don't know which has given us the best results and are anxious to see some other opinions on it.

OAK PARK NURSERIES

Leslie S. MacRobbie,

East Patchogue, L. I., N. Y.

Editor's Note: A little discussion on this subject should be very much worth while. Don't be timid about answering, you might have the big answer.

(Left) The Arroyo Seco Highway out of Los Angeles showing bank stabilization in place. (Right) The same banks under construction as described by Mr. Bowers in answering the question by Mr. Compton.

Photos Courtesy California Division of Highways

Massachusetts State College, Amherst, Mass.

R. R. Fenska,
White Plains, N. Y.

QUESTION: What is the proper way to start grass seed on an incline or steep bank?

Hugh Compton, MASS.

ANSWER: The preparation of a slope upon which to start grass seed depends a great deal upon the type of maintenance intended.

Since a steep bank was referred to, it is assumed that it is intended to allow the grass to grow naturally. If this is the case, the attached specifications for slope erosion control will be self-explanatory.

These specifications are for the treatment of slopes 1½:1 or flatter.

The attached print illustrates three classes of slope treatment, which is also self-explanatory. On the 1:1 to 2:1 slopes the ground cover is usually allowed to develop naturally. On 2:1 or flatter it is possible to mow grass with hand operated sickle bar equipment, with no change in installation procedure.

If, however, lawn is to be maintained, the grading would of necessity have to be more exact and the straw mulch, to reduce erosion until establishment of sod, should be less, probably at the rate of two tons per acre.

Before mowing, the new grass should be well rolled to compact the soil around the grass roots and to smooth off irregularities that would interfere with the mower blades.

For small terraced areas, grass may be started on burlap laid on a board or concrete surface. Approximately ½ inch of soil is spread evenly over the floor and covered with burlap. When the grass is about ½ inch high the burlap may be rolled up and laid out on the slope and held in place with pegs. The grass continues to grow and the burlap soon decays.

Slope Erosion Protection

(a) Description—Slope erosion protection shall consist of placing top soil on prepared roadway cut slopes, embankment slopes and other areas; planting





The cross section of Sugar Maple shown above was obtained by Charlie Irish several years ago and shows a very peculiar formation indicated by the lines radiating to the outer periphery. Each of these lines shows bark with annual growth appearing normally between the lines. We would like to have your diagnosis as to what caused this disorder—was it lightning, frost cracks, or what?

seed thereon of the variety specified in the special provisions; and incorporating straw cover material in the planted soil; as shown on the plans or directed by the Engineer, and in accordance with the requirements herein specified and included in the special provisions.

(b) Top Soil—Top soil shall consist of a natural mixture of about equal parts of sand, silt or clay particles, and shall be reasonably free from subsoil, stiff clay, stones larger than one inch (1") in size, noxious weeds, roots, and other objectionable material. Top soil shall not contain toxic amounts of acid or alkali and shall be capable of producing healthy plant life. All large lumps or clods in the top soil shall be thoroughly broken up before spreading on the prepared slopes.

(c) Preparation of Slopes—Excavation slopes upon which top soil is to be spread shall be roughened and loosened parallel to the roadway, by cultivating in such a manner that the top soil when spread, will be retained upon the slopes.

(d) Spreading Top Soil—Upon completion of roadway excavation, construction of embankments, and before or after the finishing of gutters as ordered by the Engineer, the top soil shall be drifted down over the slopes in a reasonably uniform manner to the depth ordered by the Engineer.

(e) Planting—Immediately after incorporating top soil on slopes as above specified, such slopes together with any other slopes and areas designated by the Engineer, shall be planted with seed, the variety of seed and the rate of sowing

to be specified in the special provisions.

In advance of seeding and if ordered by the Engineer, a fertilizer selected by the Engineer shall be furnished and incorporated with the top soil.

Immediately after seeding as above specified, the seeded areas shall be uniformly covered with rice, barley, wheat, or oat straw, spread at the approximate rate of four (4) tons per acre. The straw shall be incorporated with the soil by shoving it into the loose surface, at intervals of approximately one foot (1'), with an inverted shovel or other blunt implement or by other methods approved by the Engineer.

H. Dana Bowers,
Landscape Engineer,
California Div. of Highways.

QUESTION: How large, and what kind of a setup, should a "parks and grounds department" be for a city of 30,000 population?

Anon.,
MICHIGAN.

ANSWER: A city of 30,000 population should have, according to the prevailing standards, 300 acres of park-land, divided into, let us say, five or more separate parks. To do a good job of maintaining this property an appropriation of \$1.00 per capita, or \$30,000 in all, is very desirable if not necessary.

It is assumed that besides taking care of the trees, grass, and other necessary jobs in the park there are some baseball and softball diamonds and possibly tennis courts to keep in proper shape. This will require at least 14 men during the

growing season and about eight men through the winter, directed by a Park Superintendent or whatever the title of the supervisor may be.

The main equipment required will include two trucks, one tractor with a three or five unit mower, and at least two or three hand mowers will also be needed, and, of course, other tools necessary to do the work.

If a fairly complete recreation program is combined with the above at least another \$15,000 should be added to the budget. The budget figures quoted do not include the cost of any extensive improvements. This should come from an extra appropriation.

F. J. Pipal, City Forester,
Omaha, Nebraska.

QUESTION: We would like directions for building chests under trucks to carry tools.

Anon.,
ROCHESTER, N. Y.

ANSWER: This was tried by us but soon discarded. Our reason to consider this method of carrying tools impractical, was that we soon realized, a thousand and one reasons arise which caused the trucks to not stay put. Nearly every time the truck left the job it carried tools vitally needed.

At present we handle our tool situation as follows: We have several tool boxes of a size convenient for two men to load or unload. In one of these boxes we carry 6 handsaws, 2 bull saws, 1 mallet, 2 1½ straight edges, 3 axes, 1 hacksaw

(Continued on next page)

and 1 pr. of pliers. Ropes and ladders are carried loose in the truck. We have three pieces of strap iron bent into a "S."

These are hung on the truck sides and used as a rack for polesaws and pruners. The other boxes are stocked with tree

surgery tools and when not in use remain in the shop.

J. C. Kenealy, Tree Warden,
Ardmore, Pa.

Dear Ed:

We had a very interesting case before the Circuit Court of Baltimore here this past week. I should like to tell you a little about it because, in my mind, it could be set up as an exemplary case.

A very good customer of mine, and a friend of long standing on a family basis, was summoned to court to show why an injunction to prevent their spraying their trees and plants was not in order. Their neighbors were asking this injunction because, as they told the court, "irreparable damage to property, destruction to peace and happiness within the home and unbearable odors which persisted for months were caused by the spray materials," that we used. We had a good little argument on our hands. I was on the stand for over an hour and gave a history of the spraying we had done since 1941. We had sprayed a total of twelve times during the period between 1941 and 1946 and either used arsenate of lead, which has no odor, D. D. T. 50 per cent Wetttable, which has, in my mind and we proved to the court, a very pleasant odor, and pyrethrum with coconut oil soap which again we proved emits an odor classified more desirable than undesirable. The two products, D.D.T. and pyrethrum that did have an odor were manufactured by McCormick & Company of Baltimore, so we pulled our old friend, Dr. Badertscher into it. He explained their chemical components and each one's reaction to masonry, brick, iron, glass and painted work. After that was done, the people bringing the charges became so confused they started changing their story and their charges which knocked the whole bottom out of the case. As a result, the court gave us permission to carry on our spraying at will and unmolested by any neighbors.

We had gotten spray material on their house and the fumes went in the windows, but as the judge said, so long as the chemicals were proven to be harmless to any public property, he could see no reason why any spraying should be hindered by disagreeable neighbors or people who are not familiar with the work and the results that spraying will give.

To my mind, if we had lost this case, we would have been in a hell of a spot trying to keep the outside of our homes presentable, because within a stone's throw of every place we spray there seems to be someone who believes that spraying is a waste of time and that all the chemicals do is ruin paint. I don't know how it is in other parts of the country, but I do know that around here the people that believe in spraying are in the minority. Yet, I am happy to say, it only takes one or two outbreaks of Red Spider and Lace Fly to put them on our side.

If you would be interested in knowing a little more about this case, I would be glad to give it to you in more detail.

Sincerely yours,

H. Stevenson Clopper, Jr.
Arborist.

Dear Mr. Scanlon:

In your latest issue of Trees Magazine, which I follow with great interest, I noted with great shock and profound consternation that you referred to Texas as "The place where if you want to know more than Three Species of Trees you have to be an Authority on Cactus." I hope and sincerely trust that you were merely borrowing this gross exaggeration from someone less well informed than yourself, but rather than risk the possibility that your education has been so woefully neglected permit me to correct your false impressions of the Lone Star State.

In the first place Texas represents four of the six main timber regions to be found within the United States. The southern pine forest, central hardwoods, tropical forest, and mountain forest regions are all found in this great state.

Our tree species range all the way from the tropical wild Palm trees in the Rio Grande Valley to the Limber pine and Douglas fir of the Guadalupe Mountains.

In West Texas we also have tree regions which are almost entirely restricted to Texas, such as the cedar brakes, the oak shinneries, and the mesquite areas. In places the oak shinneries consists of fully matured trees which are not over knee-high, covering hundreds of acres. These pigmy forests are found only in Texas.

One-fifth of the entire state is covered with forests. The eastern part of the state, being the commercially important timber regions, furnishes one-sixth of the lumber crop of the entire nation.

Some of the hardest woods and the softest woods known are found in Texas. Ebony, found in the Rio Grande Valley, being the hardest and Corkwood, the softest wood, is found at the mouth of the Brazos River.

Of more than 1100 varieties of trees in the forests of the United States, about 800 trees and woody plants are located in Texas.

There are five State Forests in the eastern part of the state, as well as four National Forest whose acreage, I am ashamed to admit, I cannot quote.

As for the cactus, most of the varieties I have seen are located in a small corner of the Botanic Garden, and I have not bothered to learn their names.

For further facts concerning the great variety of the trees of Texas should you still be in doubt, I would refer you to the Texas Forest Service at College Station, Texas. However, I still think you have a splendid magazine, and I assure you that we are broadminded as our wide open spaces which we also have in superlative figures.

Very truly yours,

D. D. Obert, City Forester, Dallas, Tex.

P. S.: By the way have you ever eaten a Texas pink grapefruit? They are the world's best.

"All That Glistens Is Not Gold"

(Continued from page 5)

term tree surgery means. It is correctly applicable to but one of the many operations performed in arboriculture. Some of the largest operatives say this phase of the work represents three or four per cent of the total volume. With others it may or may not be more but at any rate it is a relatively small part of the service.

Mr. Vitas proposes to teach the forest students how to scrape trees. Why? Honest and informed arborists over most of these United States do not practice scraping shade trees. It is a common practice among the dishonest or ignorant practitioners who probably are ash haulers out trying to pick up a couple of bucks.

I feel that the following statement: "Give him a few demonstrations" is contrary to the facts and is unfair and misleading to tell any forestry student that such a limited procedure will justify his entrance into the field of arboriculture as a fully qualified operator.

In fairness to such students Mr. Vitas would do well to advise them of need for developing the ability to recognize ornamental trees, shrubs or plants, otherwise his student swinging out after those few demonstrations is very apt to leave a trail of dead or injured plants as a result of failing to protect certain varieties of trees and plants from sprays which are in general use on most plants.

The ability to recognize the insects, pests, parasitic fungi or virus diseases, non-parasitic or environment injuries and soil defi-

ciencies or toxic materials in the soil just cannot be taught or learned in a short time.

Foresters should recognize that a qualified arborist is in fact a tree doctor and that in comparison with the medical profession we are handicapped by the fact that our patients cannot say "Ah" or tell us where the pain is. Wherefore in order to operate successfully we must acquire a fund of information much of which has not been or is not now available in schools.

With over thirty-five years experience to draw upon I wish to offer this proposal: That if the Society of American Foresters wishes to propose that forestry students enter the field of arboriculture they appoint a committee to confer with a committee from the National Arborists Association and work out such courses as we find essential to effectively fit an individual to practice arboriculture.

To the end that a better understanding of arboriculture may be more general, I urge the foresters in position where they may be called on to express opinions bearing on the arboricultural field to take advantage of membership in the National Shade Tree Conference. For an annual membership fee of \$5.00 they would receive the Proceedings and the monthly "Arborist News" which together could greatly assist them in formulating opinions on arboricultural practices.

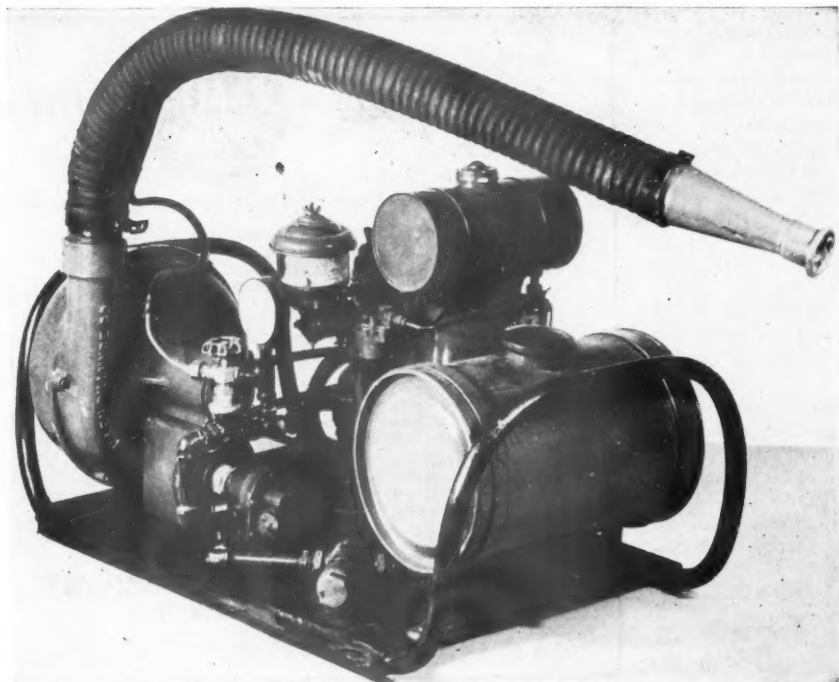
We have been holding these Conferences since 1924 and they afford the best means of obtaining arboricultural information.

Yours very truly,

/s/ Chas. F. Irish, President,
NATIONAL SHADE TREE CONFERENCE.

The NEW WAY In Spraying!

This method embodies and utilizes the new highly-effective procedures developed by S. F. POTTS, distinguished Government entomologist, as described by him in the last issue of TREES.



The Feller-Jones Mist Blower eliminates

- (a) Long hose lines
- (b) Danger of staining houses, automobiles, etc.
- (c) Need for large quantities of water. One gallon of concentrate properly used with this machine is equivalent to hundreds of gallons of conventional diluted spray material.

Wheelbarrow type.
Weighs less than 100
lbs. Can be operated
by one man.

IDEAL for insect control (including mosquito control) in orchards, nurseries, greenhouses, warehouses, livestock areas, and shade-tree plantings in parks and streets.

The Feller-Jones Mist Blower gives you—

1. Better cover of both sides of leaves, and therefore better pest control.
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Western Chapter At Berkeley

For the first time since before the war the annual meeting of the Western Chapter, National Shade Tree Conference, will be held in northern California. The policy of alternating between the north and the south was adopted at the second conference in Pasadena in 1935. The following year the meeting was held on the Stanford campus at Palo Alto.

With the war engulfing travel and practically all other facilities and interest in 1941, the decision to hold the meetings in the south, where the greatest number of members resided, was a wise one. This undoubtedly kept the conference from falling by the wayside.

Now the bi-annual treks have resumed and the local committee headed by Dr. Willis W. Wagener, have arranged a splendid program to be held in Agriculture Hall, University of California, Berkeley, June 19, 20 and 21.

The meeting will open with an address of welcome by Dr. Walter Mulford, dean, School of Forestry, University of California.

Following the dean's address the regular session will proceed as follows:

The Cultural Value of Street Trees, by Beniamino Bufano, Fine Arts Commission, City of San Francisco.

The Use of Shade Trees from the Standpoint of the Landscape and Site Planner.

Trees for Gardens and Parks.

Trees for City Streets.

Trees for Roads and Highways.

Panel discussion by members of the Association of Landscape Architects.

The Arboretum situation in California, by Ernest Higgins, president, California Horticultural Council, Berkeley, Calif.

The Large Tree Problem on City Streets, by Professor H. W. Shepperd, University of California.

Discussion:

Donald Van Riper, City of Sacramento.

Geo. W. Rash, City of Riverside.
Frank D. Anderson, City of Burlingame.

Arborists Legislation, by Roger Sohner, arborist, San Anselmo.

Shade Tree Clinic, panel of experts, including Professor E. O. Essig, University of California and Dr. Pierre A. Miller, University of California at Los Angeles.

Nature's Method of Growing Trees, by Dr. E. D. Kelly, Hillsborough, Calif.

Deficiency Diseases of Trees, by Professor C. Emlen Scott, University of California.

Commercial Fertilizers for Trees, by Mr. Weir Fetters, Oakland, Calif.

New Developments in Insecticides, by Dr. R. N. Jefferson, University of California at Los Angeles.

Members of the local committee who have aided Dr. Wagener are: Roger F. Sohner, C. E. Lee, H. N. Bosworth, A. L. Olmsted, Elmer B. Pearson, Leslie S. Mayne, Ernest Higgins.

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• D-X SPRAY—A widely used spray for the control of sucking and chewing insects. Contains 1% rotenone, .37% pyrethrins and 5% DDT.

• PRATT'S DDT SPRAYS are especially developed for shade tree work. Proper

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• PRATT'S 50% DDT—A dry wettable DDT that is micronized* to extreme fineness. *Trade Mark Reg. Micronizer Processing Co., Moorestown, N. J.

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City Park and Forestry Departments throughout the United States are discovering that the Mall Gasoline Engine Chain Saw is the fastest, most economical and most effective power saw for municipal service. It handles routine removals with speed—difficult topping operations with ease. It cuts the average ornamental tree in seconds . . . bucks it into firewood . . . and leaves a stump so small removal is often unnecessary.

In addition, arborists find that the Mall Chain Saw saves money on every job. Estimated savings range from \$1.00 per minute of operation to \$219.00 on a single removal. Such efficiency and economy rates your further consideration. Ask your Distributor or write for full details. Demonstrations can be arranged by the Mall Tool Company or their representatives.



Mechanical features of the Mall Gasoline Engine Chain Saw include a handle throttle; automatic, stall-proof clutch; index lever to turn cutting chain to any angle; and a reversible guide plate. Cutting capacities from 18 inches to 9 feet. Electric and Pneumatic models are also available.

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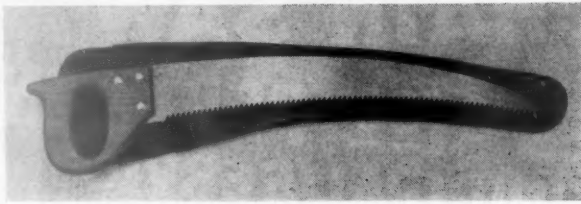


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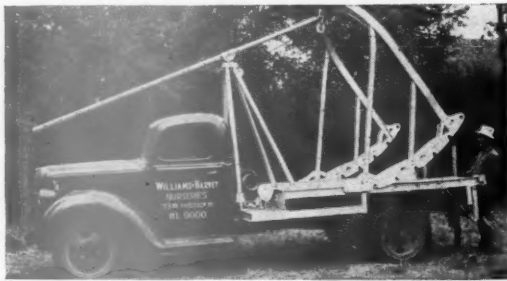
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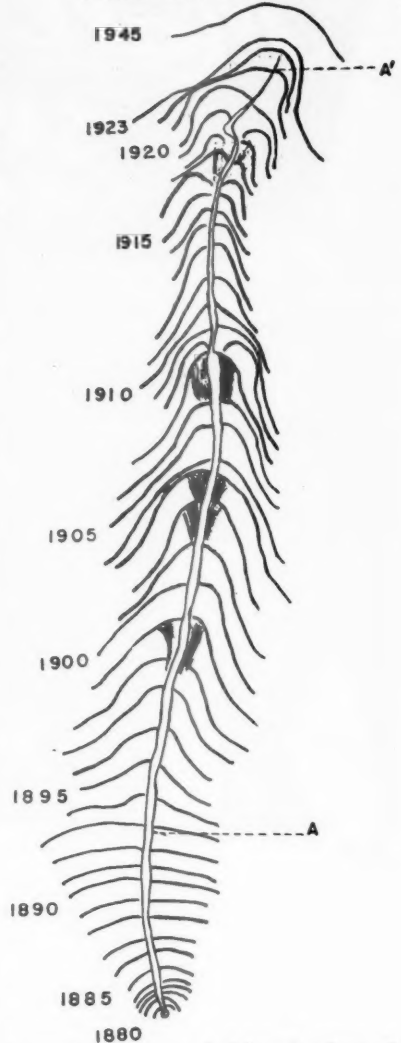
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FROST CRACK

(Continued from page 8)



to reopen and a marked loss in vigor of the tree was quite apparent in the cross section, the annual rings laid down after 1920 being only one-third to one-half the width of those laid down during the first forty years of the trees growth.

It was surprising, that with such an ideal court of infection for wood rotting fungi existing for nearly thirty years, to find the trunk still sound. The explanation for this that can be offered here is that the heavy continuous gum layer which appeared to be present along the entire length of the crack successfully protected the wood from the invasion of wood rotting fungi.

Publications in which pictures of this tree have appeared:

Codding, G. M. Frost Cracks. Tree Talk, Stamford, Conn.

Felt, E. P. and Rankin, W. H. Insects and diseases of ornamental trees and shrubs. p 121 figs. 24-25. 1932.

Mix, A. J. Winter injury. Tree Talk. Feb. p. 10. 1914

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2-4 Dow Weed Killer

Low cost. Highly recommended for killing broad-leaved weeds in lawns, to beautify parks, streets, and company buildings. Available both as a liquid and a powder.

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Especially useful against many types of woody plants, such as wild rose, poison ivy, mesquite and sprouts of many other woody species. Ideal for use on cut-over land and along right of ways.

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"Chemical Mower" for weeds along canals, ditch banks, fences and roads. Kills most annuals completely. Destroys all weeds and grass above ground, leaves roots to prevent soil erosion.

Hard, cold figures can't be denied! Take a good long look at the cost per acre—the cost per mile—or the cost per year. Figure it in man-hours saved or in results achieved . . .

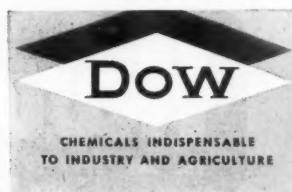
No matter how you add it up, the experience of maintenance departments everywhere indicates that you'll always come out with the same answer: *The chemical way is the economical way to control weeds.*

Get the facts—satisfy yourself. See your qualified sources—or write today for literature.

Cut maintenance costs with—
DOW WEED KILLERS

50th Anniversary, 1897-1947

The Dow Chemical Company has recently completed a 16 mm. sound movie in color, titled "Death to Weeds", containing scenes from actual field applications of Dow weed killers. This movie may be obtained for public showing by application to the Advertising Department, The Dow Chemical Company, Midland, Michigan.



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Write for name of local representative and free estimates.

Electra Protection Co. Inc.

DEPT. TR11 North Pearl St., Albany, N. Y.
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TREE NUTRITION

(Continued from page 7)

phate with equal amounts of lime. per 100 gallons of water or other spray material.

1 gallon of lime sulphur or 1½ lbs. of lime is used for every 3 lbs. of sulphate of manganese or zinc.

Cherries, apples, plums are quite responsive to such applications, and I have seen the defoliation of prune trees in New York State corrected with a mixture containing:

Manganese 10%

Copper 10%

Zinc 5%

Boron 1%

All as metallic, in the form of hydrated oxides, and applied at the rate of 4 lbs. for the combination material per 100 gallons. The addition of 2 lbs. lime is optional.

In California a manganese deficiency has been observed on English Walnuts (10), and 5—15 lbs. commercial manganese sulphate was used per 100 gallons of water during late May, through June, to correct this.

Sprays should be applied at ten-day intervals until the deficiency symptoms no longer persist.

Plausible reasons for the somewhat quicker action of sprays than fertilizers may be furnished by two prominent authorities:

McCullum (11), one of our foremost nutritionists, first noted the discovery that the leaf of the plant is a complete food, and that none of the storage organs of plants, seeds, tubers, roots, fruits enjoy that distinction. In the leaf, biological processes are most active. It is the site of synthesis of proteins, carbohydrates and fats. The leaf is rich in actively functioning cells which contain everything necessary for the metabolic processes, and they supply all the nutrients which an animal requires. ("All flesh is grass.")

Hoagland (12), another authority, writes on this subject thus:

"It is now certain that soils are not invariably capable of supplying enough boron, zinc, copper and manganese to maintain healthy growth of plants. This knowledge has come mainly during the past ten years. Within this period thousands of cases from many parts of the world have been reported of crop failure, of plant disease, resulting from deficiencies of micro nutrient elements . . . The statements do not imply that most soils are deficient in any of these ele-

SAVE

Trees · Labor · Time



Hardie Shade Tree Sprayers provide the big capacity and high pressure to make spraying from the ground quick, thorough and economical. Many models meeting every spraying need. Write for Catalog. The Hardie Mfg. Company, Hudson, Mich., Los Angeles 11, Calif., Portland 9, Oregon. Export Dept. Detroit 26, Mich. Canadian Office C. W. Lewis, Grimsby, Ontario.

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SPRAYERS

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ments, but the areas involved are large and important enough to warrant the view that the recognition of micro nutrient deficiencies constitutes a development in applied plant nutrition of major significance.

"When I refer to deficiencies of boron, copper, manganese, or zinc, it is not a question of absolute deficiency in total quantity of the element present in the soil, but rather a physiological deficiency arising from the insufficient availability of the element in the plant; in other words, not enough of the element can be absorbed and distributed in the plant for its physiological needs at each successive phase of growth."

Nutritional sprays under such circumstances may prove the remedy, and we have experimental evidence to support this. Nut trees as is shown by the above mentioned experiment, may respond to spray applications equally well as citrus, other fruit and vegetables, and effects, too, may possess special diagnostic values, showing the need of trees, and therefore also the need of soils on which they are grown.

Investigators are constantly confronted with determining whether foliage shows symptoms of disease or starvation, and whether this is due to a deficiency or an excess of any particular nutrient; whether fungicides inhibit the generation of fungi from the spore state, or whether the plant is fortified from sprays or dusts to become disease resistant, or repellent.

Fungicides are valueless where plant disease is caused by bacteria which invade the water conducting tubes (roughly corresponding to the blood vessels of mammals), of plants, tree trunks, etc. and prevent the flow of water and nutrient solutions from roots to leaves. Deprived of water and nourishment, the plants or trees will wilt and die. Where, however, soils furnish these plants with protective inorganic nutrients, such as manganese, copper, iron, zinc, borax, etc. these bacterial diseases are prevented. Similar actions may take place in leaves.

(To be continued)

Perk Up On N. S. T. C. Photo Contest

There will be three prizes of \$25.00, \$15.00 and \$10.00 for the best pictures submitted for display at the 23rd National Shade Tree Conference in Cleveland, August 18-22nd.

The subjects must be tree preservation practices, trees or any directly related subjects. Prints should be 11x14 and must be sent to Dr. J. S. Houser, Ohio Agricultural Experiment Station, Wooster, Ohio. Dr. Houser is chairman of the Educational Exhibits Committee.

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- Pruning Tools
- Bracing Material
- Tree Compounds

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Just as a small boy "hates" Castor Oil, so the birds avoid berries, plants, and gardens that have been dusted with BIRDS-OFF! Never before has there been a product anything like BIRDS-OFF! Now going into its third year of success, it is being widely used by small gardeners, by commercial growers and in many instances by the park department in the large metropolitan cities.

PROTECT YOUR BERRIES, PLANTS AND GARDENS
Send 50c cash, M. O., Check or Stamps for an 11 ounce package in a carton with a sifter top. Easy to apply.

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SPRAY TALLEST SHADE TREES

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JOHN BEAN Sprayers

Shade tree experts insist on sprayers with the power and capacity to handle any shade tree job quickly and efficiently, without wasting spray materials. John Bean Shade Tree Sprayers are built to these specifications. Their powerful pumps deliver a driving spray that reaches top-center of the tallest trees. All-steel tanks do not absorb spray materials—can be cleaned after spraying with 2, 4-D. Tanks available in 400-, 500-, and 600-gallon capacities. Equipped with a Bean Spraymaster gun, they are efficient for spraying flowers, shrubs, and lawns with insecticides, fungicides, fertilizers.

For spraying weeds on lawns without harm to nearby flowers, or shrubs, there's the new John Bean Lawn Protector—a pusher-type spray applicator, weighing only 43 lbs. and designed for use with 2, 4-D and other weed control chemicals. Write for catalogs on Shade Tree Sprayers or Lawn Protector.

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CAUSED BY IRON DEFICIENCY

May be helped by
spraying with

JIMP

\$1.25 for 4 oz. pkg.—makes
1½ gals.

\$3.00 for 1-lb. pkg.—makes 6 gals.

\$25.00 for 10 pounds—makes
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Trees...

The Useful Globe-head Elm on the Cover

It has been difficult to obtain background information on the tree which is the cover subject of this issue.

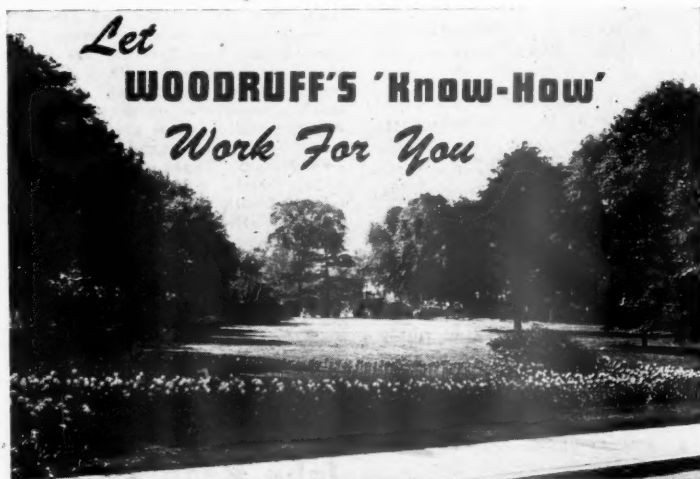
The Globe-headed elm seems certain to have originated in Europe of smooth leaf elm parentage (*Ulmus carpinifolia*) and the most logical varietal name we can find is *U. c. umbraculifera*. The tree is propagated by working on English elm stock (*U. procera*). There is significance also in the fact that this tree derives from the same parentage as the Christine Buisman elm, a Dutch elm disease resistant strain of the European smooth leaf elm.

Some years ago, Klehm Bros. Nursery at Goodland, Indiana, propagated a great number of the trees and many fine specimens dot nearby towns in both Illinois and Indiana. At about the same time, approximately 35 years ago, a horticulturist in Cleveland, Ohio, Michael Horvath, had imported many rare specimen trees from Europe, among them was the Globe-head elm. His original importation still stands at his old home near Painesville. There is probably much additional data that could be assembled on the origin of this

interesting tree, and it is hoped it will be sent to TREES.

The trees on the cover are located in Moline, Illinois, on 19th Avenue Boulevard and according to Ralph B. Birks, Superintendent of Parks, to whom we are indebted for this picture, are about 30 years old. The tree is characterized by thin, tough, tapering branches that suit them admirably for planting on city streets under wires. Any pruning would be to contour and consequently, would result in no disfigurement such as that done to conventional trees when large cuts lead in excessive suckering with the result that clearance becomes almost an annual necessity. If the tree is grafted on an eight, or even seven-foot stock, little difficulty will be experienced in lifting for pedestrian or vehicular passage.

To the best of our knowledge this street in Moline, nearly two miles in length, is the only street of Globe-heads in the country. Their loss would be a severe one and it is sincerely hoped that a contemplated widening of this street will find a means of preserving these notable trees, to the lasting credit of the people of Moline.

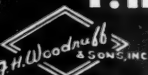


Woodruff lawn seeds have been making parks more beautiful for a good many years. That's because Woodruff knows the special conditions park men face. Heavy traffic, shady areas, varying soil conditions—Woodruff has the 'know-how' to provide the right seed formula for the right spot. Woodruff agronomists are always ready to study your individual lawn problems and help you solve them. Drop us a line, no obligation, of course.

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Time-tested, effective sprays, skillfully blended with powerful wetting, spreading and penetrating agents, enabling sprays to reach crevices and leaf axils. Complete in themselves. Simply add water as directed for control of both chewing and sucking insects.

TREE WOUND DRESSING

Compounded of selected gums, oils, pine tar, etc. Provides a tough, elastic, quick-drying black coating for live exposed wood. **Will not kill back delicate tissues at margin of cut.**

SPRED-O-STIK

A waterless, pourable liquid providing added wetting, spreading and sticking qualities for use in all types of sprays. There are no soap or soap forming materials—will not clog nozzles—can be used with hard or soft water.

TREE FOOD

Based on a uniform blending of richly organic materials compounded to become available gradually over an extended period.

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Trees...

TREE-WOUND PAINT

Contains 0.2 per cent Phenol Mercuric Nitrate. Conforms to Federal Specification TT-V-51a Recommended by New Jersey Department of Agriculture, Bulletin No. 360.

This wound paint is quite resistant to deterioration by weathering and does not interfere with good callousing where experimentally applied to Elm, Poplar, Norway and Silver Maple, White Pine, Oak and Apple.

\$1.75 per gallon, F. O. B. East
Rutherford, N. J.

W. J. SUTCLIFFE CO.

Manufacturers of
Fine Paints and Varnishes
EAST RUTHERFORD, N. J.

Western Arborist Supply Co.

Out in the golden west, in Los Angeles, a new business has sprung up. For many years there has been a need for a supply house for arborists' supplies—now they have it.

Irving Humphrey has opened his doors, as of April 1st, at 5063 W. Washington Boulevard.

Irv is an ex-marine, ex-skinner (Bartlett Tree Expert Co. and others) and had a try at nursery work. He will handle Fanno saws, Seymour Smith pruners, H. E. Muench eyebolts, lags, etc., and would like to contact manufacturers of guy strand cable, pole-saw heads, electric and air cavity tools, rope and sprayers.

Being an ex in several fields he hopes western arborists, park departments and nurseries will not let him become an ex-business man.

To Clean Sprayers After 2, 4-D

A material for cleaning sprayers after 2, 4-D applications that has recently been used is household ammonia. Use it at the dilution of one part of ammonia to 100 parts of warm water. The ammonia-water solution should be allowed to soak in the spray drum for several hours before it is thoroughly rinsed out with clear water. Trisodium phosphate at the rate of one pound to twenty-five gallons of water has also been used with apparent success.

What Is a "Micron"?

Aero-Mist operators using DDT will hear more and more of "microns" as a measurement of a DDT crystal. Officially, then, a "micron" may be described as follows:

There are 2.54 centimeters to one inch.
There are 10 millimeters to a centimeter.

There are 1,000 microns to a millimeter.

Therefore, there are 25,400 microns to one inch.

A DDT crystal with a "micron size of 200" is approximately 1/128-inch.

—Aero-Mist News.

TREE GOUGES AND CHISELS

For immediate delivery
(Subject to Prior Sale)



Our Gouges and Chisels are especially made for tree surgery, being hand forged of high grade steel and finely tempered. Blade and shank are forged in one piece for maximum strength. All furnished with iron ring handles. Blades are 6 1/2" long. Specify No. 341 Gouge and No. 251 Chisel for best results.

ALSO AVAILABLE NOW:
Composition Mallets in three sizes, 16 oz., 24 oz., and 41 oz., Leather Cavity Kits, Tree Surgeon's Slicks, Electric Drills and Augers for tree feeding, Manila Rope, Tree Paint, Sectional Ladders, Disston Power Chain Saws, etc.

Write for your free copy of catalog No. 29 showing our complete line of Tree Trimming Equipment and Supplies.

Ask About Books and Bulletins On Tree Care

BARTLETT MFG. CO.

3028 E. Grand Blvd. Detroit, Michigan

Precision ONE MAN Chain Saw



This is the new Precision Type "1" 20" Bow Saw (patent pending) being used by one man for felling. This machine is now available immediately. **Four other types of Precision Saws are also manufactured using the same motor.** All attachments are interchangeable at small extra cost. Over 5,000 Precision Saws now in operation all using the well known and reliable 3 1/2 H.P. PRECISION Air Cooled 2-Cycle Motor. Full particulars on request.

**H. A. Smith, 25796 Center Ridge Road
Westlake, Ohio—Phone Westlake 329**

Tell advertisers—"I saw your ad in TREES Magazine"

N. A. A. News

(Continued from page 9)

contacts with their clients and the public inform them that complete tree care can be given.

It does seem important, though, when "Tree Surgery" is used in professional journals to designate the work done by arborists or shade tree experts. In a recent issue of the Journal of Forestry, vol. 45, no. 3, page 166, Mr. George Vitas, in an article, "American Forestry Schools Must Come Out Swinging" under a section headed "Tree Surgery" attempts to give a brief resume of arboriculture. Certainly, both the author of the article and the Journal of Forestry are to be criticized for such misuse of terms. And it is time that foresters and Forestry Schools learn that to be a qualified arborist a student needs more than "a few demonstrations," as indicated in Mr. Vitas' article, after having completed basic training in a Forestry School. The need for trained arborists is pressing, but the Forestry Schools are not going to supply them unless those schools have a better understanding of the requirements than were presented by Mr. Vitas.

Sick Horsechestnut Trees Can Be Saved

Horsechestnut trees in many places in New York State have suffered from a disease known as leaf blotch. Many of these trees have been defoliated by midsummer. Since all of the food in trees is manufactured in the leaves, the severely diseased trees are greatly reduced in vigor and thus susceptible to other diseases, according to Dr. Ray R. Hirt of The New York State College of Forestry, Syracuse University.

Dr. Hirt states that the vigor of the trees may be increased by proper fertilization early this spring. Ordinary 5-10-5 fertilizers may be used but 10-8-6 or 10-6-4 fertilizers probably give better results. They should be applied in about the amounts of 2 to 4 pounds for each inch in diameter of the trunk at breast height. With a punch-bar, holes 12 to 18 inches deep should be spaced 2 feet apart in the soil, extending from beneath the tips of the outside branches back to within 2 feet of the trunk. The holes should be filled with fertilizer and moistened with water. This treatment will not cure the diseased trees but will improve their health.

Dr. Hirt adds that the disease may be further reduced and possibly controlled by the proper application of suitable fungicides. It does not pay a tree expert company to mix the proper spray for one or two trees, thus a number of neighbors ought to agree to have their trees sprayed and arrange with a reliable company to spray the trees as needed. The first spray should be applied just after the buds have opened, followed by 2 sprays 10 days to 2 weeks apart, and a third treatment if the season is rainy. Experience has shown that Bordeaux mixture, 3-4-50 formula, or lime sulfur diluted 1 part to 49 parts of water is effective.

Dr. Hirt says, "There are no all-purpose sprays. Tree companies that go down the block applying to any and every tree whatever spray they happen to have in the spray tank are either unscrupulous or thoroughly unfamiliar with sprays and their purposes.

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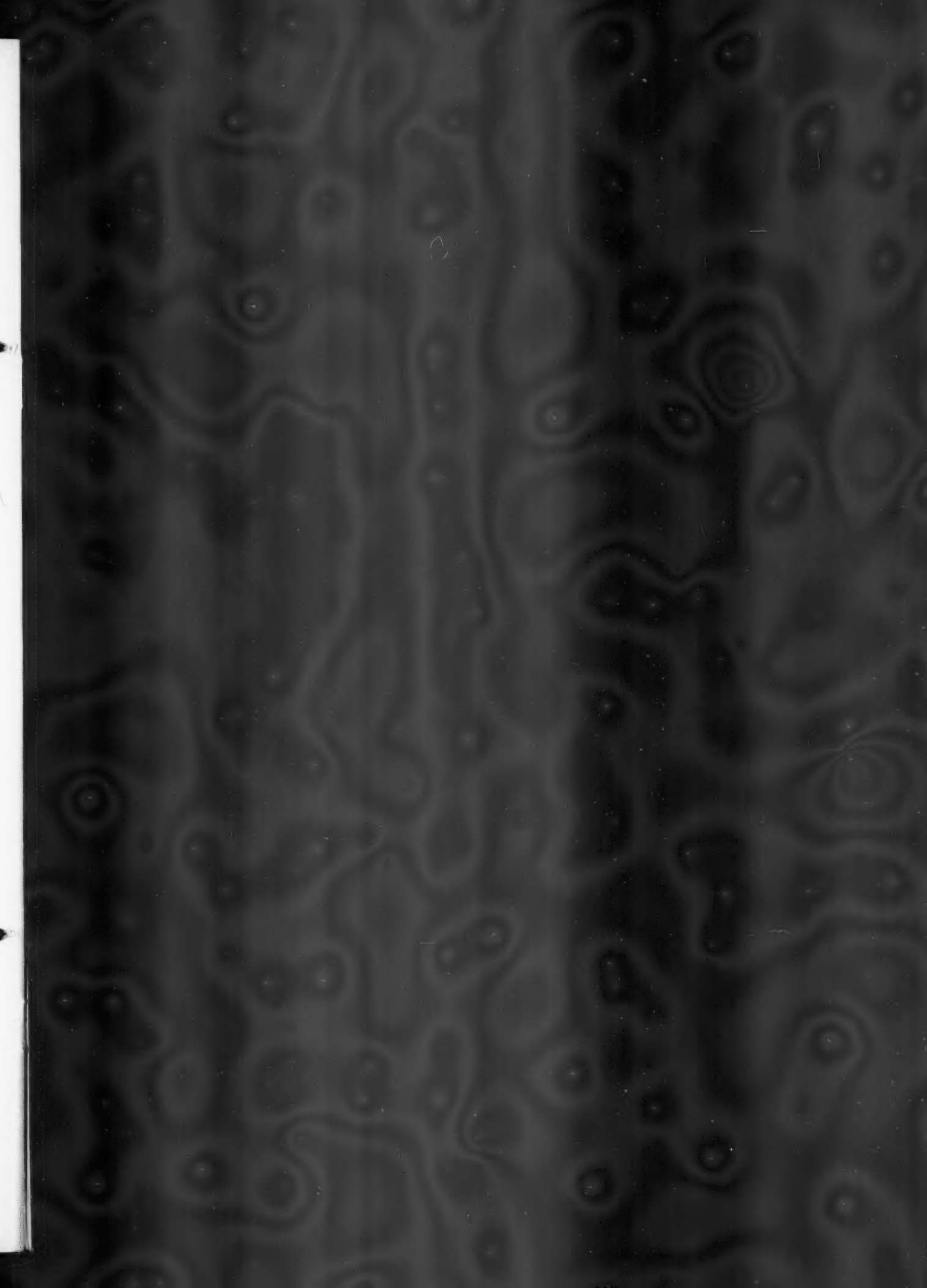
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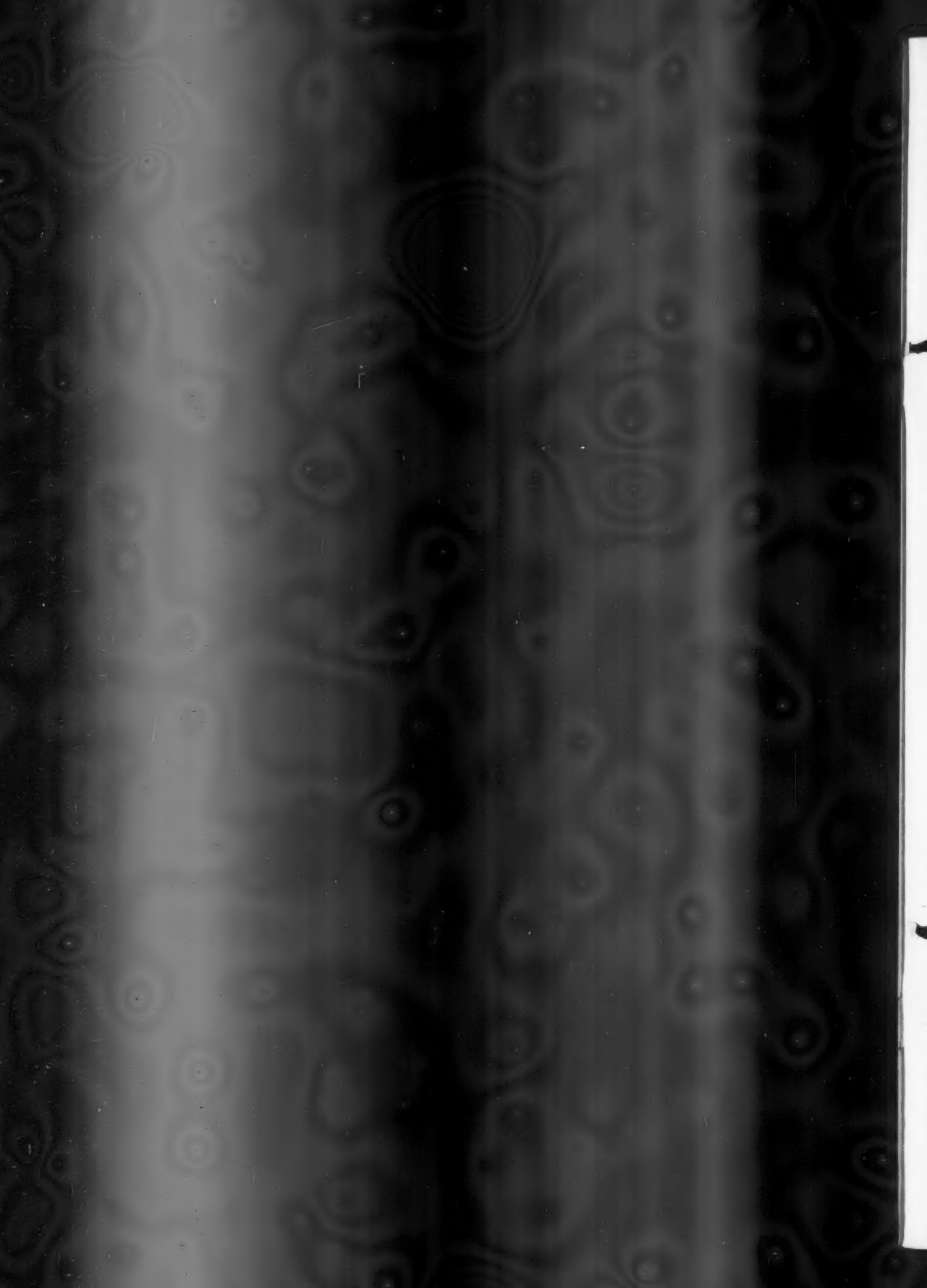
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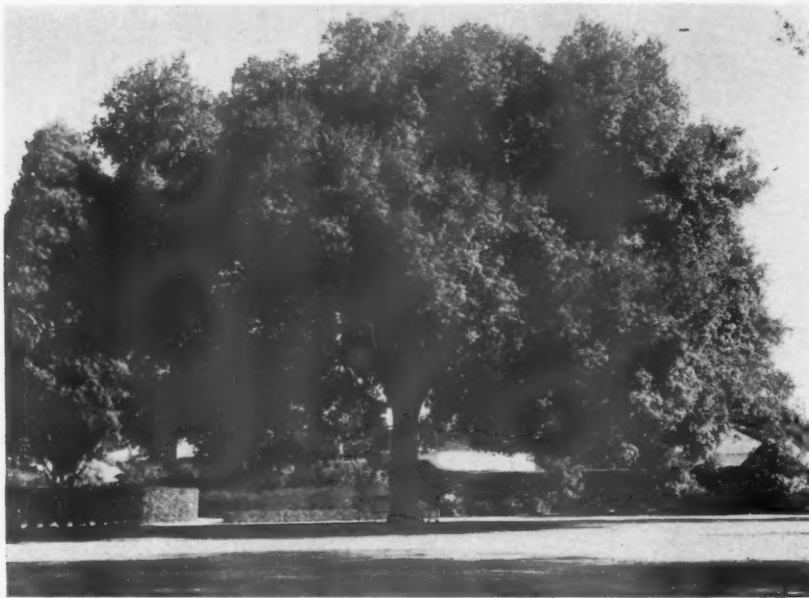




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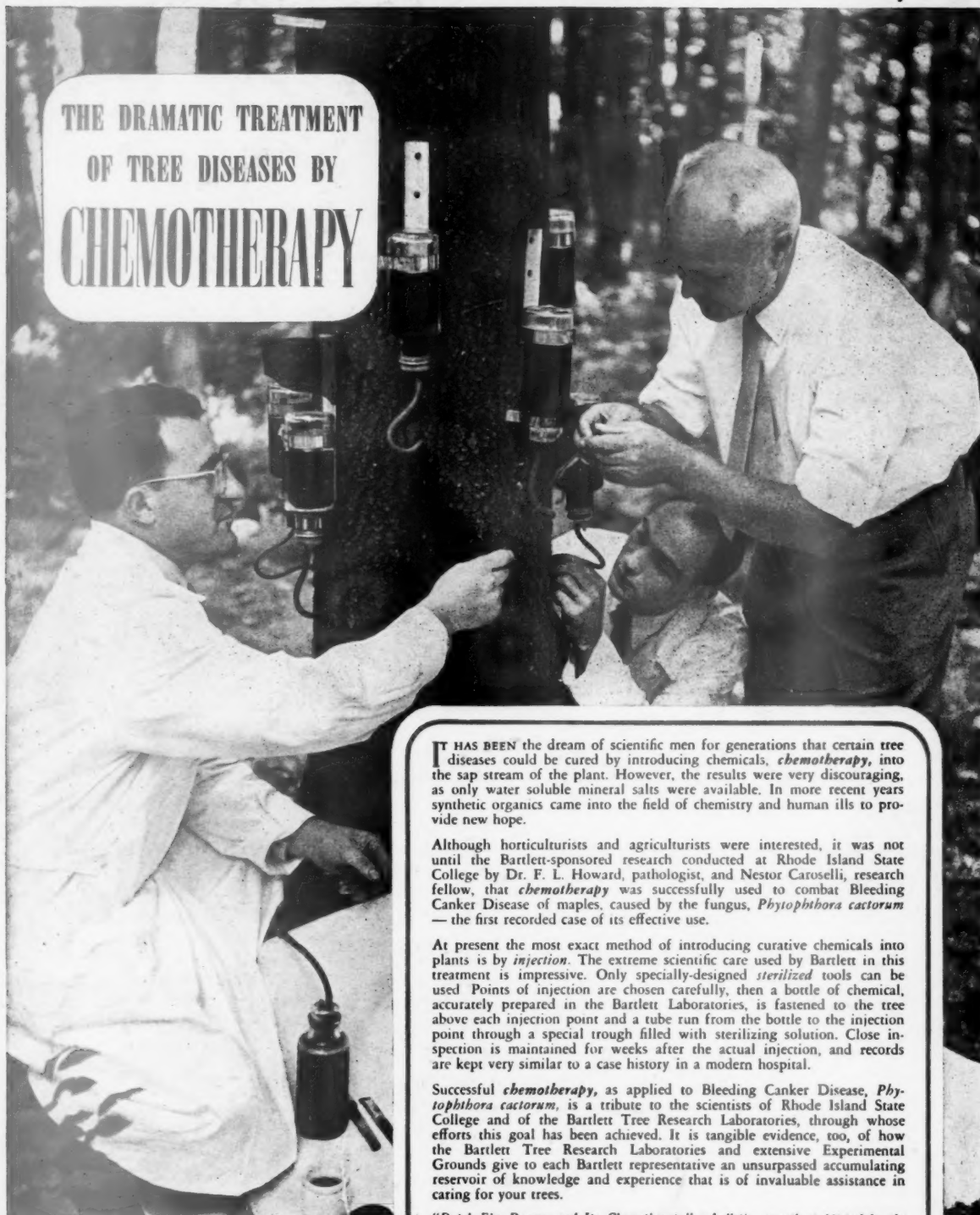
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THE DRAMATIC TREATMENT OF TREE DISEASES BY CHEMOTHERAPY



IT HAS BEEN the dream of scientific men for generations that certain tree diseases could be cured by introducing chemicals, *chemotherapy*, into the sap stream of the plant. However, the results were very discouraging, as only water soluble mineral salts were available. In more recent years synthetic organics came into the field of chemistry and human ills to provide new hope.

Although horticulturists and agriculturists were interested, it was not until the Bartlett-sponsored research conducted at Rhode Island State College by Dr. F. L. Howard, pathologist, and Nestor Caroselli, research fellow, that *chemotherapy* was successfully used to combat Bleeding Canker Disease of maples, caused by the fungus, *Phytophthora cactorum* — the first recorded case of its effective use.

At present the most exact method of introducing curative chemicals into plants is by *injection*. The extreme scientific care used by Bartlett in this treatment is impressive. Only specially-designed *sterilized* tools can be used. Points of injection are chosen carefully, then a bottle of chemical, accurately prepared in the Bartlett Laboratories, is fastened to the tree above each injection point and a tube run from the bottle to the injection point through a special trough filled with sterilizing solution. Close inspection is maintained for weeks after the actual injection, and records are kept very similar to a case history in a modern hospital.

Successful *chemotherapy*, as applied to Bleeding Canker Disease, *Phytophthora cactorum*, is a tribute to the scientists of Rhode Island State College and of the Bartlett Tree Research Laboratories, through whose efforts this goal has been achieved. It is tangible evidence, too, of how the Bartlett Tree Research Laboratories and extensive Experimental Grounds give to each Bartlett representative an unsurpassed accumulating reservoir of knowledge and experience that is of invaluable assistance in caring for your trees.

"Dutch Elm Disease and Its Chemotherapy" a bulletin recently published by the Connecticut Agriculture Experiment Station is a tribute to the excellent work of Drs. Horsfall, Zentmeyer and Wallace. We recommend that you send for this valuable and enlightening bulletin.

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